

BIOHACK NOTES



# TRANSPORT IN PLANTS

- BASED ON ACTIVE RECALL AND SPACED REPETITION
- TARGET 360/360 IN NEET BIOLOGY & 100/100 IN BOARDS!



**PARTH** GOYAL





## • INTRODUCTION

1. Transport over long distances proceeds through the vascular system and is called \_\_\_\_\_
2. In rooted plants transport in xylem is uni/multidirectional,
3. Multidirectional transport happens in \_\_\_\_\_
4. PGR are transported in a strictly polarised manner. T/F



## • MEANS OF TRANSPORT

5. Diffusion is a fast/slow process.
6. Diffusion in/of solids is more likely.
7. Diffusion rates are affected by (4) \_\_\_\_\_
8. Smaller substance diffuse faster. T/F
9. Inhibitors react to \_\_\_\_\_
10. The \_\_\_\_\_ are proteins that forms huge pores in inner/outer membrane of the \_\_\_\_\_, \_\_\_\_\_ and \_\_\_\_\_ that allows molecules up to size of small proteins to pass through.
11. Water channels are made up of how many different types of aquaporins?

12. Saturation is not the property of facilitated diffusion. (T/F) (NEET 2013)

13. A gradient must already be present for diffusion to occur. (T/F)

14. Diffusion directly proportional to solubility of substance in lipids. (T/F)

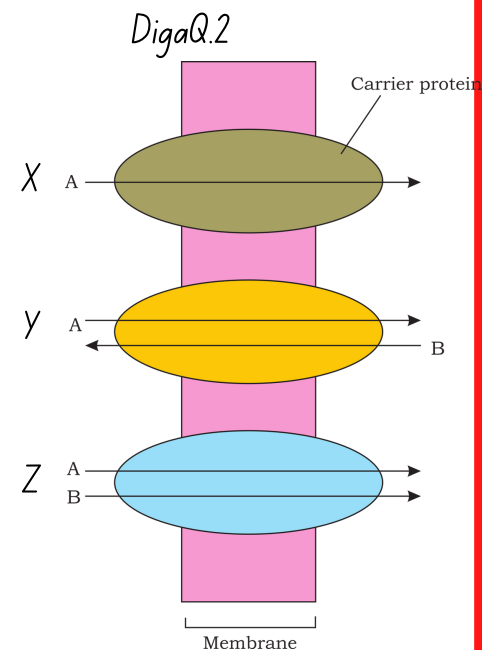
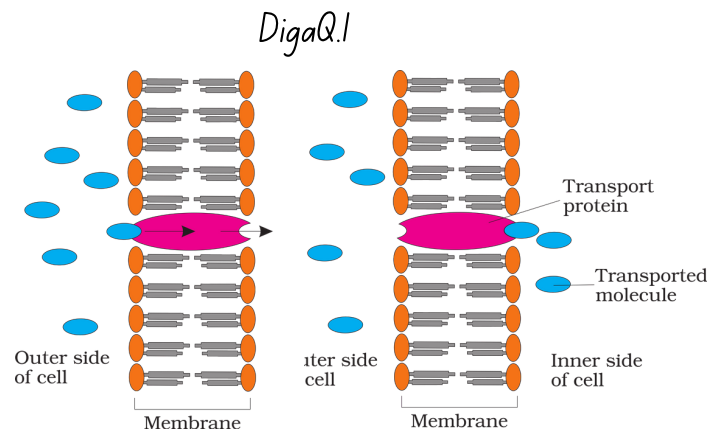
15. Facilitated diffusion is independent of ATP (T/F)

16. Na/K pump is an example of \_\_\_\_\_ (active/passive)  
 \_\_\_\_\_ (symport/antiport)

17. Active transport uses energy to transport and pump molecules along a concentration gradient. (T/F) (AIPMT 2000)

18. Active transport doesn't saturate. (T/F)

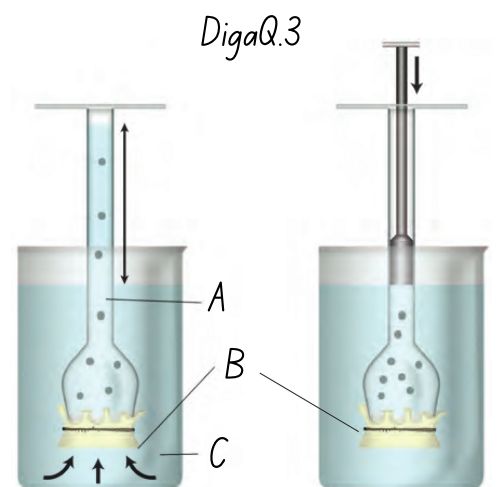
19. Like enzyme, the carrier protein is very specific in active transport. (T/F) (NEET 2019 Odisha)





## • PLANT WATER RELATIONS

20. Terrestrial plants take up huge amount water daily but most of it is lost to the air through evaporation from the leaves, is called
21. Watermelon have \_\_\_\_\_% water.
22. Seeds have water in them. (T/F)
23. Most herbaceous plants have only about 10 to 15% of its fresh weight as dry matter (T/F)
24. A mature corn plant absorb \_\_\_\_\_ liters of water a day.
25. \_\_\_\_\_ plant absorbs water equal to its own weight in 5 hours.
26. The two components of water potential are \_\_\_\_\_ and \_\_\_\_\_
27. The greater the concentration of water in a system, the greater is its kinetic energy or 'water potential'. (T/F)
28. Pure water has maximum water potential i.e. 1. (T/F) (NEET Odisha 2019)
29. Water will move from the system containing water at \_\_\_\_\_ water potential to the one having water at \_\_\_\_\_ water potential. (NEET 2013 & AIPMT 2007)
30.  $\Psi_s$  is always negative. (T/F)
31. For a solution at atmospheric pressure (water potential)  $\Psi_w =$  (solute potential)  $\Psi_s$ . (T/F)
32. In plants, \_\_\_\_\_ and \_\_\_\_\_ are important determinants of movement of molecule in and out the cell.
33. \_\_\_\_\_ is the term used to refer specifically to the diffusion of water across a differentially or selectively permeable membrane
34. The net direction and rate of osmosis depends on both the pressure gradient and concentration gradient. (T/F)
35. At equilibrium the two chambers should have nearly the same water potential. (T/F)
36. If the external solution is more dilute than the cytoplasm, it is hypertonic. (T/F)
37. Osmotic pressure equal  $\Psi_p$ . T/F
38. Numerically osmotic pressure equal water potential. T/F
39. Numerically osmotic pressure equal osmotic potential. T/F
40. Osmotic potential and solute potential is the same thing. T/F



41. \_\_\_\_\_ occurs when water moves out of the cell and the cell membrane of a plant cell shrinks away from its cell wall.

42. In plasmolysis, water is first lost from the vacuole, then the cytoplasm. T/F

43. The process of plasmolysis is usually irreversible. T/F

44. The space between the cell wall and shrunken protoplast is occupied by \_\_\_\_\_

45. Flaccid cells are found in \_\_\_\_\_ solution.

46. What would be the  $\Psi_p$  of a flaccid cell?

47. \_\_\_\_\_ is ultimately responsible for enlargement and extension growth of cell.

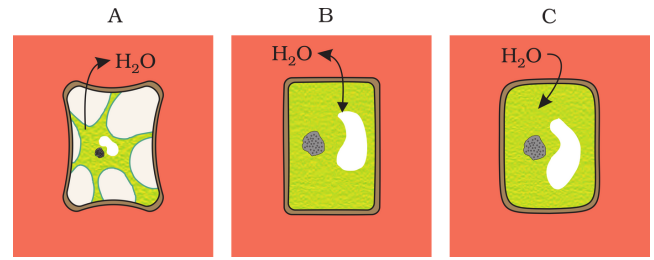
48. \_\_\_\_\_ is a special type of diffusion when water is absorbed by solids – colloids – causing them to increase in volume.

49. The classical examples of imbibition are absorption of water by seeds and dry wood. (T/F)

50. Imbibition is also diffusion since water movement is along a concentration gradient. (T/F)

51. For any substance to imbibe any liquid, affinity between the adsorbent and the liquid is also a prerequisite. (T/F)

DigaQ.4



## • LONG DISTANCE TRANSPORT OF WATER

52. Xylem is associated with translocation of mainly water, mineral salts, some organic nitrogen and hormones. (T/F) (NEET 2019)

53. Phloem translocates inorganic solutes also. T/F

54. The \_\_\_\_\_ is the system of adjacent cell walls that is continuous throughout the plant, except at the \_\_\_\_\_ of the \_\_\_\_\_ in the roots

55. The apoplastic movement of water occurs

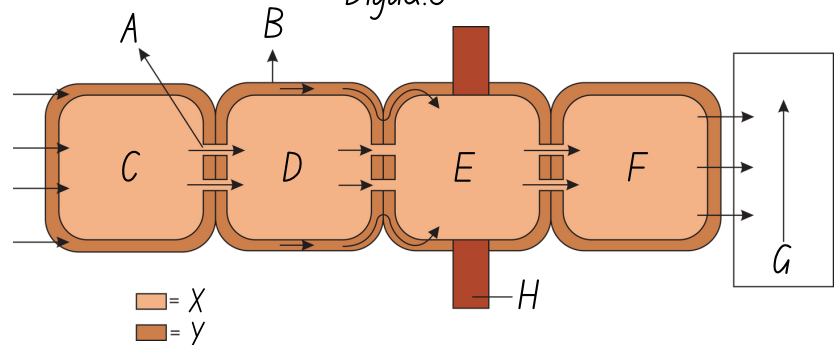
exclusively through the intracellular spaces and the walls of the cells. (T/F)

56. Movement through the apoplast does involve crossing the cell membrane. (T/F)

57. Mass flow of water occurs due to the \_\_\_\_\_ and \_\_\_\_\_ properties of water.

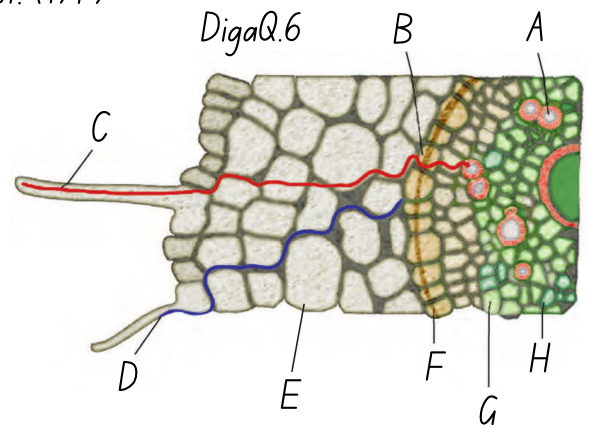
58. The \_\_\_\_\_ system is the system of interconnected protoplasts

DigaQ.5



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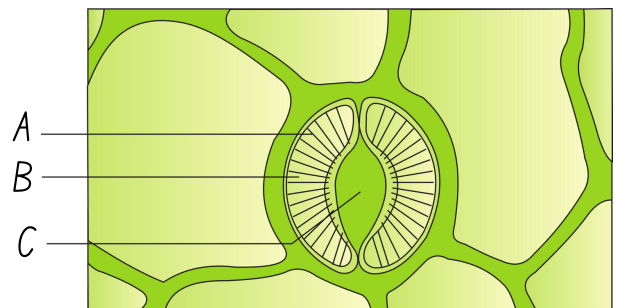
59. Neighbouring cells are connected through cytoplasmic strands that extend through -----
60. Movement is relatively faster in symplastic pathway because of aid by cytoplasmic streaming. (T/F)
61. Movement of which organelle is seen in Hydrilla leaf due to cytoplasmic streaming ?
62. Most of the water flow in the roots occurs via the apoplast. (T/F)
63. Casparian strip have suberin/lignin.
64. The movement of water through the root layers is ultimately ----- in the endodermis.
65. The water after crossing the endodermis follow the symplastic pathway only till leaf. T/F
66. In mycorrhizae, fungus provide (2)
67. In mycorrhiza, the root provide (2)
68. Pinus seeds can germinate and establish in the absence of mycorrhizae. T/F
69. Excess water collects in the form of droplets around special openings of veins near the tip of grass blades, and leaves of many herbaceous parts is known as ----- (NEET 2020)
70. Greatest contribution of root pressure is
71. Root pressure do not play a major role in water movement up tall trees. . (T/F) (NEET 2015)
72. Less than \_\_\_\_ % of water reaching the leaves is used for photosynthesis and growth.
73. Transpiration can be studied from a leaf using ----- paper.



## • TRANSPIRATION

74. Transpiration is the evaporative loss of water. T/F
75. Exchange of oxygen and carbon dioxide in the leaf occurs through stomata. T/F
76. The inner wall of guard cell is thick/thin, elastic/inelastic.
77. Transpiration maintains the shape and the structure of the plants by keeping the cells turgid. (t/f)
78. The immediate cause of the opening or closing of stomata is a change in the turgidity of the ----- cells
79. Microfibrils made up of ----- are oriented radially/longitudinally.
80. The lower surface of a dorsiventral leaf has a greater number of stomata. (T/F)
81. In isobilateral leaf they are equal in number on both sides. (T/F)
82. Mutual attraction between water molecules called -----

DigaQ.7





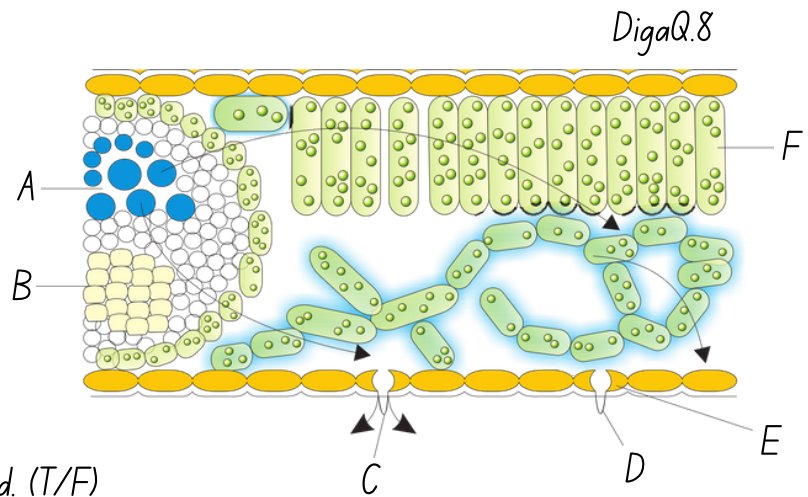
83. Attraction of water molecules to polar surface called \_\_\_\_\_

84. External factors affecting transpiration (4) (NEET 2018)

85. Plant factor affecting transpiration (4) (NEET 2017)

86. When turgidity increase, inner walls become \_\_\_\_\_ shaped.

87. Transpiration driven ascent of sap is driven mainly by 3 factors. Name them.



88. Tensile strength means?

89. Transpiration maintains the shape and structure of the plants by keeping cells turgid. (T/F)

90.  $C_4$  plants are \_\_\_\_\_ times as efficient as  $C_3$  plant.

91.  $C_4$  plant loses only \_\_\_\_\_ as much water as  $C_3$  plant for same amount of  $CO_2$  fixed. T/F



## • UPTAKE AND TRANSPORT OF MINERAL NUTRIENTS

92. Ions are absorbed from the soil by both passive and active transport. (T/F)

93. Transport proteins of \_\_\_\_\_ cells are control points, where a plant adjusts the quantity and types of solutes that reach the xylem.

94. Root endodermis because of the layer of \_\_\_\_\_ has the ability to actively transport ions in one direction only.

95. Mineral ions are frequently remobilised, particularly from older, senescing parts. (T/F)

96. Elements most readily mobilised are (4)

97. Calcium since structural component cannot be remobilised. (T/F)

98. Nitrogen travels in both organic and inorganic components. (T/F)

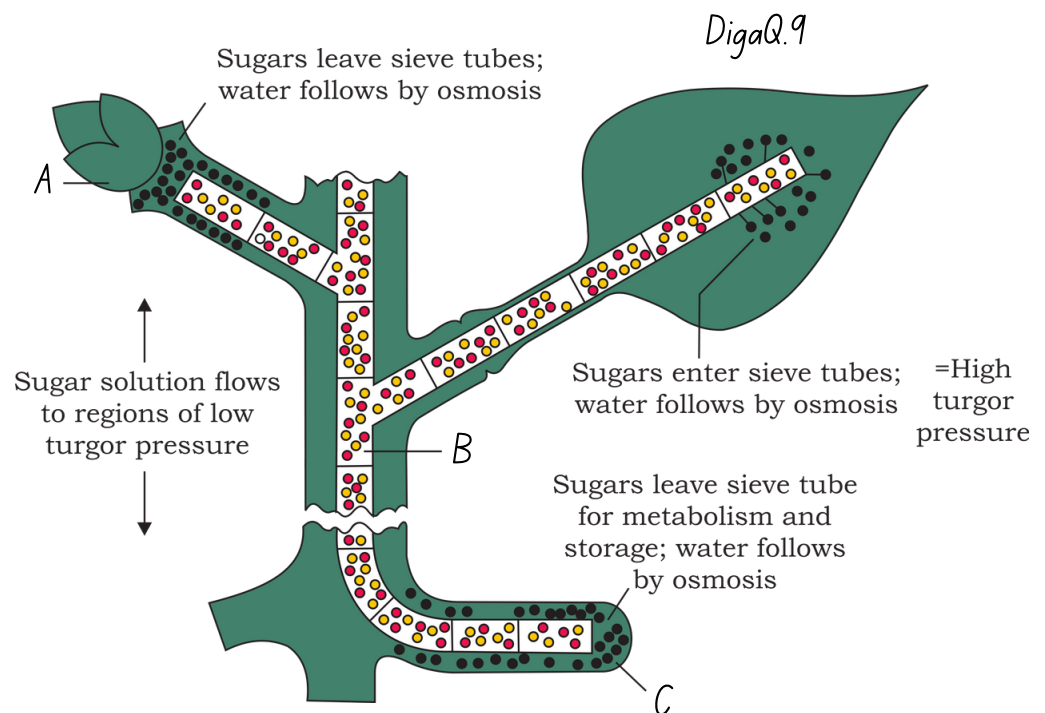
99. We can't say categorically that xylem transport only inorganic material and phloem transport only organic material. T/F





## • PHLOEM TRANSPORT: FLOW FROM SOURCE TO SINK

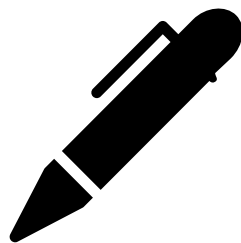
100. Source and sink may be reversed depending on \_\_\_\_\_ (NEET 2019)
101. Hormones are transported through xylem/phloem.
102. The source-sink relationship is variable in food translocation. (T/F)
103. The sucrose made is first moved into sieve tube/companion cell.
104. The sugar is moved from companion cells to sieve tube through passive/active transport.
105. Cytoplasmic strands pass through holes in the \_\_\_\_\_
106. \_\_\_\_\_ is used to identify tissues through which food is transported.
107. The translocation in phloem is explained by \_\_\_\_\_ hypothesis.



# TRANSPORT IN PLANTS



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# ANSWERS





## ANSWERS

1. Translocation
2. Unidirectional
3. Phloem
4. T

### • MEANS OF TRANSPORT

DigaQ.1 - Facilitated diffusion

DigaQ.2 - Facilitated diffusion

X - Uniport

Y - Antiport

Z - Symport

5. Slow
6. Diffusion in solids rather than of solids more likely
7. Concentration gradient, permeability of membrane, temperature, pressure
8. T
9. Protein side chain
10. Porins, plastids, mitochondria, some bacteria
11. Eight
12. F
13. T
14. T
15. T
16. Active, antiport
17. F
18. F
19. T

### • PLANT WATER RELATIONS

20. Transpiration
21. 92%
22. T
23. T

24. 3 litres
25. Mustard
26. Solute potential and pressure potential
27. T
28. F
29. High to low
30. T
31. T
32. Cell membrane and tonoplast
- DigaQ.3 - Osmosis
- A - Sucrose solution
- B - Membrane
- C - water
33. Osmosis
34. T
35. T
36. F
37. T (sign is opposite)
38. T
39. T
40. T
- DigaQ.4 - Plant cell plasmolysis
- A - Plasmolysed
- B - Flaccid
- C - Turgid
41. Plasmolysis
42. F
43. F
44. Hypertonic
45. isotonic
46. Zero
47. Turgor pressure
48. Imbibition



49. T

50. T

51. T

## • LONG DISTANCE TRANSPORT OF WATER

DigaQ.5 - Pathway of water movement in root

A - Plasmodesmata

B - Plasma membrane

C - Epidermis

D - Cortex

E - Endodermis

F - Pericycle

G - Xylem

H - Casparian strip

X - Symplast

Y - Apoplast

52. T

53. T

54. Apoplast, casparian strips, endodermis

55. T

56. T

57. Adhesive and cohesive

58. Symplastic

59. Plasmodesmata

60. F

61. Chloroplast

DigaQ.6 - Symplastic and apoplastic pathways of water and ion absorption and movement in roots

A - Xylem

B - Endodermis

C - Symplastic path

D - Apoplastic path

E - Cortex

F - Casparian strip

G - Pericycle

H - Phloem

62. T

63. Suberin

64. Symplastic

65. F

66. Minerals and water

67. Sugar and nitrogen containing compound

68. F

69. Guttation

70. Re-establish the continuous chains of water molecules

71. T

72. 1%

73. Cobalt chloride

## • TRANSPIRATION

DigaQ.7 - A stomatal aperture with guard cells

A - Microfibrils

B - Guard cells

C - Stomatal aperture

74. T

75. T

76. Thick and elastic

77. T

78. Guard cells.

79. Cellulose microfibrils, radially

80. T

81. T

82. Cohesion

83. Adhesion

84. Temp, light, humidity, wind speed

85. No. of distribution of stomata. % of open stomata, water status, canopy structure

86. Crescent

87. Cohesion, adhesion, and surface tension



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DigaQ.8 - Water movement in the leaf

A - Xylem

B - Phloem

C - Diffusion into surrounding air

D - Stomatal pore

E - Guard cell

F - Palisade

88. An ability to resist pulling forces

89. T

90. Twice

91. Half

## • UPTAKE AND TRANSPORT OF MINERAL NUTRIENTS

92. T

93. Endodermal

94. Suberin

95. True

## • PHLOEM TRANSPORT

96. Phosphorus, sulphur, nitrogen, potassium

97. T

98. T

99. T

100. Season or the plants need

101. Phloem

102. T

103. Companion cell

104. Active transport

105. Sieve plates

106. Girdling

107. Pressure flow hypothesis

DigaQ.9 - Mechanism of translocation

A - Tip of stem

B - Phloem

C - Root



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NEET ASPIRANTS TO FEAR OF  
BIOLOGY -

